Ben Clingenpeel

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Education

Estimated	Georgetown University
May 2023	Bachelor of Science in Mathematics
	GPA: 4.00

Interests

I am a senior studying mathematics at Georgetown University and am interested in pursuing a career in mathematical research and teaching at the college level. My research interests are still developing, but I have most enjoyed topics in algebra and topology. I have worked on projects in combinatorics—related to the Catalan numbers and flip graphs of polygon triangulations; in cryptography—studying the commutative algebra behind multivariate polynomial based cryptosystems; and in knot theory—studying p-colorings of symmetric union presentations of ribbon knots and related invariants.

Papers

2022 | **Invariants of partial knots and symmetric union presentations.** With Zongzheng Dai, Gabriel Diraviam, Kareem Jaber, Krishnendu Kar, Ziyun Liu, Teo Miklethun, Haritha Nagampoozhy, Michael Perry, Moses Samuelson-Lynn, Eli Seamans, Ana Wright, Nicole Xie, Ruiqi Zou, and Alexander Zupan. *In preparation.*

Presentations

2023 | **Colorings of knots with symmetric union presentations.** Talk given with Eli Seamans at the special session of the Joint Mathematics Meeting on the Polymath Jr program.

Research Programs

June-August 2022 | **Polymath Jr.** A collaborative mathematical research program for undergraduates. Project on symmetric union presentations of ribbon knots and associated invariants under the supervision of Dr. Zupan of University of Nebraska–Lincoln.

Experience

Jan 2022 - Present
Math Tutor | Georgetown University Math Assistance Center

- Tutored Georgetown University students in lower division courses.
- Helped multiple students at a time, mostly with material from calculus and statistics.
- Led trainings for new tutors.

Aug 2021 - Present
Math Teaching Assistant and Grader | Georgetown University

- Graded student assignments in MATH 215, Abstract Algebra (Spring 2022, Fall 2022).
- Graded student assignments in MATH 150, Linear Algebra and held a weekly office hour (Fall 2021).

Jan 2020 - May 2020
Math Tutor | Georgetown University GUMSHOE Program

- Volunteered with a campus math and science tutoring group.
- Worked with middle school students from DC's seventh and eighth wards who came to campus for extra weekend math lessons.

Sep 2017 - Present
Math Tutor | Freelance

- Tutored students at a variety of different levels, some in middle school and high school classes, as well as a few in first college calculus courses.
- Designed curricula for students who weren't following a given course schedule. For these students, I selected appropriate topics in math that don't typically appear in middle school and high school curricula.

Upper Level Coursework

MATH 471, 472, 480
Graduate Courses: These are some of the core courses offered by the department for the first year of the PhD program. They are cross-listed so that undergraduate students register for the 400-levels and graduate students for the 600-levels, but all students attend the same lectures and have the same assignments. These are (in order) Real Analysis, Advanced Linear Algebra, and Functional Analysis (in progress).

MATH 301
Topics in Commutative Algebra and Cryptography: This is a tutorial to cover some ideas in commutative algebra and their applications to cryptography to support research towards an honors thesis (to be completed in Spring 2023).

MATH 301	**Topology Tutorial:** I worked with Professor Bonventre to design this tutorial based on the text *Topology Through Inquiry* by Michael Starbird and Francis Su. The course was set up as an IBL study of point-set topology, as well as an introduction to some topics in algebraic topology, including the classification of 2-manifolds and the fundamental group.
MATH 211, 215, 221, 310, 314, 315, 316	**Upper Level Undergraduate Courses:** These are (in order) Number Theory & Cryptography, Abstract Algebra, Combinatorics, Analysis I, Nonlinear Differential Equations, Computational Algebraic Geometry, and Complex Analysis.

Honors and Awards

- Georgetown University Tropaia.
- First Honors every semester at Georgetown.
- Poetry Recitation Contest Winner, Grodno State University 2021.

Skills

- Proficient in LaTeX and comfortable with the Tikz package.
- Basic programming skills in R, Sage, Macaulay2, and Python (including familiarity with the Manim library for math animations).
- Comfortable editing video using Hitfilm and DaVinci Resolve.
- Intermediate Russian.